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A N
E S S A Y
ON THE
DISEASES of the BILE,
More particularly its
CALCULOUS CONCRETIONS,
CALLED
GALL-STONES.

B Y
WILLIAM WHITE, M.D. F.S.A.

SECOND EDITION.

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MDCCLXXVII.



DISSEMINATION OF THE BIBLE

GALILEO GALILEI

WILLIAM WHITE, M.D.

SECOND EDITION

Printed by J. Johnson, St. Paul's Church-Yard, London.

P R E F A C E.

***B**y way of preface to this edition, I shall give a short account of such disorders as in some symptoms resemble, and are pretty generally mistaken for, those arising from biliary concretions.*

I think there is hardly one species of disease, ranked by Professor Cullen under the heads of Dyspepsia and Colica, which I have not known thus misapprehended. It is however to be observed, that great sagacity, assisted by long experience, will not be found in every case sufficient to distinguish the species, from the varieties, in this large class of disorders.

The Colica Pictonum, or that species of abdominal pain arising from Lead, is, in many parts, a very common disease, though

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not so about us; yet I have known it mistaken for gall-stones in several instances.

The Colica Pituitoria of Sauvage, a disorder yet more rare, and which has never, that I know of, been properly described. In this disease, after a cruel and continued series of painful sufferings, which, in many, had withstood every means of relief, and the best advice for many months, an expectoration by stool of a quantity of cold viscid phlegm, resembling the most transparent and firm jelly, has at once demonstrated the cause of the colic, and procured a cure to the patient. This disease was known to the ancients; Galen gives an instance of it in his own case. De locis affectis, lib. 2. cap. 5.

Inflammations of the substance of the liver, are a very frequent cause of incurable chronic affections of that organ, and remotely of the whole alimentary canal. Here the insensibility of the part, when the investing membranes are not much affected, but slightly
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draws the attention of the patient, who generally attributes his complaints to an accidental indigestion: thus the only proper means of cure are neglected till too late, and he certainly becomes a valetudinarian for life, languishing under a suppurated, or infectious febrile liver. This case is very common, I have seen it in some who, from their profession, ought to have been more attentive to their own situation and feelings.

There is another mistake yet more common, which is taking the disorder from gall-stones, for the gout at the stomach. This, in some particular situations, may happen not to be of great consequence; in general, however, the patient must suffer greatly from it. I have seen the disorders from biliary concretions, attended with an inflammation of the part, and general fever, mistaken for the gout in the stomach; here the strongest cordials and stimulants have been poured into the patient, to drive the imaginary gout into the extremities.

extremities. It is needless to relate the consequences.

Nothing is more common than to hear of deaths from the gout at the stomach; I cannot help suspecting it to be in reality a rare occurrence; and am persuaded that, was our idea of the nature of this disease sufficiently distinct and accurate, many mistakes would be prevented.

YORK, }
March 20, 1777. }

INTRO.

INTRODUCTION.

IT is surprizing, that so little mention is made in the writings of the most eminent authors, of the disease which is the subject of the following Essay.

Biliary Calculi, or Gall-stones, were altogether unknown to the ancients; but when the dissection of morbid bodies became more general, they were frequently met with by anatomists in the three last centuries, but they seem to have had no idea of the symptoms attending their presence in living subjects.

Two of the most eminent physicians of our own country, *Sydenham* and *Mead*, make no mention of them in their works; and the great *Boerhaave* only speaks of them as being sometimes the occasional cause of the Jaundice, though we are told that he particularly recommended this disease to the notice of his Pupils.

The celebrated *Hoffman*, the late Professor *Simson*, and the Baron *Van-Swieten*, first Physician to the Emperor, give us some occasional remarks upon this disease, but in a transient and unsatisfactory manner. Dr. *Coe* wrote professedly upon the subject of biliary concretions; his work is a collection from other authors, he made no experiments upon the nature of the Calculi, sets out with declaring he knows no method of dissolving them, and throws no fresh light upon the curative part.

Dr. *Heberden*, in an essay upon the Jaundice, [*Med. Transf.* vol. I.] has made some observations upon this disease; his observations are such as might be expected from a physician of his deserved reputation; he, however, gives us no experiments upon the subject.

We are not to suppose this disease to be a new one, because so many eminent men have passed it over in silence. It has been, no doubt, and I know that it still continues to be, often mistaken for some uncommon

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common kind of colic, for spasms, from an hysterical, rheumatic, or gouty origin.

It is, in truth, so far from being a rare disease, that it appears on the contrary to be a very common one, though seldom suspected unless the patient quits the stones; then indeed the disease is obvious. Dr. *Simson* believes the stone in the gall-bladder to be as frequent an occurrence as those in the urinary passages. And Professor *Haller* says, that the former is much more common, especially at *Gottingen*, and wishes ardently that a method of cure might be discovered for so frequent, painful, and dangerous a disorder.

I have heard a physician of the first eminence declare, and from experience I have found it true, that he believed few people were intirely exempt from them, that they were generally the cause of the disorders of the stomach and bowels, and many times of disorders usually called *Nervous*.

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Authors, who have mentioned this disease, give us in general only the symptoms attending their passage through the biliary ducts. I have enlarged in this important part, and endeavoured to be more full, to trace them from their first appearance in the system, before the disease shews itself by the most alarming and evident signs; this I have performed with all possible care; but must own, as yet, little to my own satisfaction, *Difficile in tenebris viam carpere*, but shall endeavour in future, by every possible attention, to pursue the subject, as a most important one to the health and ease of mankind.

It must be observed, that there are examples of Calculi voided by stool, which are of a real stony or fabulous composition, resembling the urinary ones in external appearance, and like them soluble in the caustic alkali, but containing no bile in their composition. Totally different from such are the true biliary calculi, both as to texture, composition, and solubility. The former come not from the biliary passages,

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passages, they are probably concretions formed in the pancreas, similar to those formed in the salival ducts; they may be sometimes formed in the intestines, there being many instances of intestinal calculi of a stony or gritty texture, having a real gall-stone for their nucleus. The true biliary calculi are only here meant; the nature and composition of which are explained in the following Essay.

I thought it not amiss to premise some general remarks upon the Liver, not only to satisfy such as are not much conversant in anatomy, but as the consideration of its attachments enables us to account for many symptoms arising from stones in the gall-bladder.

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INTRODUCTION

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E S S A Y

On the DISEASES of the LIVER.

SECTION I.

Of the Liver.

IT will be unnecessary here to enter upon a minute description of this important viscus; it may not, however, be amiss to mention its situation, connections, and use in the animal economy.

The liver is a large and pretty solid glandular mass, of a dark red colour, inclining to yellow, situated partly in the right hypochondrium, which it nearly fills up, and stretching across under the appendix ensiformis, or pit of the stomach, between it and the spine of the back, it terminates in the left hypochondrium, into which, in some subjects, it runs a considerable way.

In

In its healthful state it is covered entirely by the ribs, except where it passes under the pit of the stomach, in which part it is only covered by its own proper membranes, the abdominal muscles, and the common covering of the body. When in a diseased state, it is sometimes found considerably elongated.

Hence it may be easily felt in that part, when the body is put in a proper position for relaxing the abdominal muscles.

- Its figure is irregular, being convex on the upper part, and unequally concave towards the back.

- Its convex side is connected to the diaphragm by three ligaments; one at the extremity of each lobe, and one in the middle. The right ligament frequently connects the great lobe to the cartilages of the false ribs; the middle one is fixed to the rectus abdominal muscles. Besides these ligaments, the great lobe of the liver is also connected to the diaphragm by a broad

broad and immediate adhesion. The middle ligament contains in its duplicature a thick white rope, like a ligament coming from the navel, which was the umbelical vein in the foetus.

The right, or great lobe of the liver, rests on the right kidney; it likewise covers a portion of the arch of the Colon, and the Pylorus, or lower orifice of the stomach.

It is plentifully supplied with arteries, veins, nerves, and lymphatics, for the purposes of its economy, sensation, and nourishment. By means of the sympathetic or intercostal nerves, and the singular manner by which the blood is conveyed to it and returned from it from the secretion of the bile, it is connected with, and greatly influences the contents of the thorax, and universally all the other abdominal viscera.

Thus, from connection of parts, the stomach, in diseases of the liver, is affected

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with indigestion, nausea, and vomiting; the intestines with spasms, and flatulencies; the diaphragm with hiccapping; the lungs with phlegm, cough, and asthmatic symptoms. From the universal connection of the stomach with the rest of the system, a new set of symptoms are often superadded. In the head, violent pains, vertigo, and disturbed vision; in the heart, intermitting pulse, and faintings, &c. When the liver is infarcted, or the return of the blood from it intercepted, a different, but direful set of symptoms arise; in this case the return of the venal blood is obstructed in the other abdominal viscera; hence Hæmorrhages; the Piles; what we term Anxiety, the most distressful of all sensations, not to be described by words, in which the mind seems to suffer more than the body; and lastly a Dropsy, the general and fatal termination of diseases of the Liver.

Thus universally may the body be affected, in consequence of a disease of a particular part, daily examples of which occur.

occur. It is, however, no less true than comfortable to reflect, that, by curing the disease of the liver, we cure the rest; by taking away the cause, we obviate the effect; unless, by long continuance of such various disease, the body has become incurably deranged, which is too often the consequence of neglect at the beginning of the disorder.

The use of the Liver is very important in our œconomy, being the principal organ for the secretion of the Bile.

The gall-bladder is a small bag, or receptacle of a pyriforme shape, lying in a depression upon the inner or concave part of the liver, towards the back, and verging a little towards the right side. From this cyst a small duct or canal is sent off, called the Ductus Cysticus, which being joined in its passage by another of the same kind from the liver, called the Ductus Hepaticus, forms the Ductus Communis Cholidocus, which, after running a certain length, opens into the cavity of the Intestines,

testines, a little below the lower orifice of the stomach.

The Bile being separated from the mass of blood by the Liver, is partly lodged in the gall-bladder as a reservoir, whilst part runs thro' the hepatic duct in an uninterrupted stream into the Intestines, for its several uses in the œconomy.

S E C T. II.

The Nature and Properties of the Bile.

THE Bile is a saponaceous fluid, of a deep or greenish yellow colour, a sweetish bitter taste, and is diffusible in water.

In its healthy state, it shews no tendency to acidity, or alcalescency, but is in that respect perfectly neutral.

Alcalies have a tendency to dissolve the bile, rendering it very acrimonious and stimulant. *Fordyce.*

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It is decomposed by Acids, for being mixed therewith, a gummi-resinous matter is precipitated from it, having the peculiar smell of the animal, melting imperfectly in a moderate heat, nearly insoluble in water, but is partly dissolved in ardent spirits.

I have found, from experiments, that the vegetable acid produces the greatest quantity of this precipitated matter from the bile, which, as also the liquor, was yellow.

Next to the vegetable acid, the muriatic produces the greatest quantity of coagulum, of a light blue colour not staining the fingers; the liquor was a brownish green.

The nitrous acid produces less precipitated matter than the two former, but of a light blue colour, scarce staining the fingers; the liquor of a very saturated green colour.

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The vitriolic acid produces the least quantity of coagulum, and that of a light green, intermixed with several small tenacious masses of a brown colour, and tinging the fingers with a fine yellow, which withstood repeated washings; liquor of a faint greenish yellow colour.

The smell was the same in all, peculiarly disagreeable, and I think *sui generis*. The Bile was taken from a recent subject, and perfectly sweet. Many curious conclusions may be drawn from these experiments, but must defer them at present.

The Bile is a fluid very prone to putrescency, it is capable of contracting a putrid disposition, even in the body.

Sir John Pringle took a quantity of Bile from the body of a Gentleman, thirty-six years of age, who died of a dropfy, following an obstinate jaundice. He divided it into three portions; to one of which he added a fixed alkaline salt, but this occasioned no change in the colour, which was

a dark green. Into another, he dropped some spirit of vitriol; into the third, common vinegar; and observed in both the last a manifest effervescence, with a change of the colour to a light green.

The Bile certainly has a power, in some degree, of dissolving mucilaginous and resinous substances; hence it is, though improperly, called saponaceous, though in strictness this term ought only to be applied to a combination of expressed oil and an alcali; accordingly this property of the bile is greatly confined. When used with this intention, it leaves a considerable musky odour behind it.

This fluid is strictly of two kinds, the cystic, and the hepatic. It is a very thin and dilute fluid when secreted, but acquires its consistency by lying in the gall-bladder, from the absorption of its more fluid parts.

All vegetable bitters have a power of correcting acidity; the Bile, which is
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the animal bitter, possesses the same quality. Hence, when the passage of this important fluid into the bowels is obstructed, as in cases of gall-stones, the acetous fermentation of the aliment rises to a morbid degree, producing sour belchings, heart-burn, &c.

I much wish that practitioners, in general, would sufficiently attend to the nature of the digestion of the food in animal bodies, and seriously reflect upon the various phenomena attending that process. I am sure it would give them a great insight into the nature of the various disorders of the stomach and bowels, and point out the rational and efficacious method of curing a most common and distressing series of diseases. It is only from such calm and steady observation of nature in her various operations in the human body, that we shall ever be able to check them when too violent, or incite them when too remiss; when, from a combination of unfortunate circumstances, neither of those can be effected by art, it will enable him to point out

out the reasons of such failure, why his patient is curable or incurable, the event, and dissections, will often prove the truth and propriety of his prognosis.

It is with a view to this, that I am here induced to make a short digression upon the nature of that process.

All animal and vegetable substances, when bereaved of life, run into a spontaneous fermentation, by which their texture is destroyed, their component particles are separated, new combinations are formed for the nutrition of the succeeding animal and vegetable creation, nothing ultimately remaining but a portion of earth, the common basis of all sublunary bodies.

This process is divided into three stages, according to the order in which they succeed each other, the Vinous, the Acetous, and the Putrefactive Fermentations; from three remarkable phenomena attending them.

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We shall instance this in the fermentation of vegetables. The first stage is called the Vinous. Here the texture of the vegetable is totally destroyed, combinations not existing before are formed, a vinous liquor and ardent spirits being generated. To this succeeds the acetous, the liquor being now sour and called vinegar, shewing no vinous tendency, no appearance of an ardent spirit. At length the putrefactive stage comes on, the acetous disappears, an alcalescency is prevalent, and the whole becomes thick, putrid, and offensive.

Animal substances run into the putrid process with great rapidity, insomuch that the vinous and acetous stages are liable to be overlooked, unless the greatest attention is given. Milk is an animal fluid, capable of the vinous fermentation; the *Tartars* have a method of obtaining an inebriating liquor from milk, *Lac pro potu, acescens, fermentans & distillatum inebrians*, *Forster Specimen Hist. Nat. Volgensis*.

During

During fermentation, a great quantity of air is detached, and flies off from the fermenting body; this is not the same with our common atmospheric air, but differs from it in many respects; an animal breathing in it instantaneously expires.

The digestion of the aliment in the stomach, is now proved to be a real fermentatory process, perfectly analogous, during which all the different stages are in some degree, especially in a morbid state of the stomach, gone through.

When the stomach is in a state of perfect health, its action upon its contents vigorous, I believe that our food only undergoes the vinous fermentation there, it being propelled into the bowels too quickly for the other to take place, which requires delay and stagnation. But when this organ is much debilitated, when it is affected with atonia, it is incapable of vigorous action upon its contents, and inertia takes place; hence the aliment runs into the acetous fermentation with rapidity,

dity, and is a course of great and continued distress to the system. I doubt whether the putrid fermentation is capable of taking place in the stomach, except from a putrid ferment induced *ab extra*.

We can easily induce any of three stages of fermentation in the stomach, from swallowing a certain quantity of the ferment proper to each. Thus the vinous one will be incited by a draught of wort in brisk fermentation; the acetous from a too free use of vinegar and acid fruits; the putrefactive, by swallowing a small quantity of putrid matter. But in such cases, if the stomach be in an healthful state, and the causes not too often repeated, the effect will be but temporary. Nature has surprising resources, for maintaining and restoring the health of the system.

I cannot but suspect, that physicians are too apt to esteem meer deviations in the fluids from the standard of health, as the chief causes of diseases, particularly of the of the stomach, and to this direct their
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indications of cure; but I am persuaded that diseases from this cause are seldom dangerous, and easily curable.

It is from a morbid state of the solids that the system becomes dangerously, permanently, and too often, incurably diseased; and upon which depend chronic deviations from health in our fluids. This is particularly applicable to disorders of the stomach.

A proper attention to this gives clear and distinct indications of cure; it also renders the prognosis certain.

Patients labouring under stomach complaints are universally put upon a course of Bitters and Absorbents; if these prove fruitless, which is generally the case, the disease is looked upon as desperate. The error here consists in our mistaking a symptom for the primary disease; whilst we are curing the first, we forget that we are neglecting the last; we are obviating the effect, without attending to the cause.

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It is then no wonder that we so often fail in the cure of such diseases.

I have said that we are to attend to the state of the solids of the parts in all chronic diseases of the stomach, and reflect in what manner they may deviate from their natural state; our curative indications will then be founded upon a firm and natural basis.

The simple solids may be in a morbid state of laxity. The cure here is obtained by the use of astringents.

The moving fibres may be in a state of morbid debility. This is a frequent cause of stomach complaints, and is obviated by astringents.

Debility of the moving fibres is often attended by increased irritability, and, in consequence of the last, with spasmodic affections. This state of the stomach, and what I have most frequently met with, is cured by astringents, antispasmodics, and sedatives.

It

It may be matter of surprize to many, that I have made no mention of emetics, purgatives, bitters, absorbents, antiaacids, &c. in the curative indications; but the learned reader will readily see the reason, they have no power of curing any of the above-named morbid affections, though implicitly relied upon in common practice.

Notwithstanding this, they are remotely of use, by evacuating of saburra, by checking the alimentary fermentation, by absorbing and neutralizing the morbid acid. By obviating the violence of particular symptoms they have excellent effects, but respecting the disease as an aggregate, they are merely palliative, incapable of affecting a perfect and permanent cure.

I have thus given the outlines of a pretty extensive practice in all kinds of stomach complaints. I can, from experience, declare, that the common method of treatment of such disorders is inadequate, and, in many respects, improper, as it only amuses the patient till his complaints

plaints become too inveterate for art to remove; but I propose, at my future leisure, a more exact discussion of the subject.

SECTION III.

The Use of the Bile.

THE Bile was esteemed by the ancients to be a fluid merely excrementitious; a noxious humour separated like the urine from the mass of blood, for the preserving of the health of the body.

A more enlightened Anatomy, an attentive inquiry into the properties of this fluid, and to the changes induced in the system when its excretion is impeded, or totally intercepted, have shewn the bile to be a fluid of important use in the animal œconomy.

Its most obvious property is that of mixing together the watry and oily parts
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of our food by its saponaceous quality; and as dissolving the more fibrous and solid part of the aliment. But proper reflection upon the changes that take place in the alimentary canal, when deprived of the salutary influence of the bile, points out more important uses.

1. As a constant stimulus, peculiarly adapted to the bowels, in order to keep up their peristaltic motion; for constiveness always attends the impeded excretion of the bile. Some of the first authority in medicine have been led to dispute this, from observing that Bile, when given by the mouth, shewed no purgative effect; this probably followed from their giving it when inspissated, as was the case, I have found from experience, that recent fluid bile will gently move the bowels.

2. As a checker of fermentation, a fluid provided by nature for retarding the acetous and putrid stages in our food. For, when the flow of the bile into the bowels is interrupted, symptoms of a prevailing

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acid; as spasms, sour eructations, heart-burn, &c. instantly shew themselves.

The Bile is a bitter fluid; hence, by reasoning *a priori*, we imagine that it can obviate all the three stages of alimentary fermentation, in common with the other bitters; hence the common practice of giving the vegetable bitters, to supply the place of the bile when deficient, and always without success, and for obvious reasons, sometimes with manifest disadvantage. But the bile differs essentially from other bitters, in promoting the vinous fermentation, but checking the acetous and putrid stages; all other bitters obviate all the three. This curious phenomenon is too replete with practical inferences to admit of a proper discussion here; and, amongst many others, points out to us the necessity and use of experiments.

SECTION.

S E C T. IV.

Diseases of the Bile.

IT readily appears, from what hath been said of the nature and properties of this fluid, that the first signs of its being diseased must appear in the organs appropriated for the digestion of our food. It is therefore necessary, in all disorders of the stomach and bowels, to have regard towards the use and condition of the bile.

The Bile may be disordered many ways, either in quantity, or quality, or in both.

When it is secreted or excreted in too great proportion, but still retaining its healthy qualities, it seldom occasions great uneasiness, but goes off in a spontaneous bilious diarrhæa.

It may, on the contrary, be secreted too sparingly for the purposes of the œconomy; hence arise many obstinate diseases,

with all the consequences of an imperfect chylopoæsis.

It is diseased in quality, chiefly by contracting a dangerous acrimony, either acid, alkaline, or putrid. The consequences of these morbid conditions of the bile are easily understood, if we have a just idea of its nature, properties, and use in the healthy state.

The symptoms of an acid tendency in the bile, are flatulencies, acidities, loose stools of a pale yellow colour, greenish when severe, with a sourish smell; heart-burn, voracious appetite, spasms, an imperfect assimilation of the food; hence, a thin, poor, and watry blood, incapable of properly stimulating the solids, followed by obstructions, cachexy, stagnations of the fluids in their vessels, dropries. A train of symptoms similar to this, is caused by the bile being in a too weak or inert state.

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The predisposing and occasional causes to this disease, are, 1. Constitutional debility of the system in general. 2. Too sedentary way of life. 3. Too inert and glutinous aliment, as fish, fat, and mucilaginous meats, especially boiled. 4. The abuse of vegetable diet, and fermented liquors; as wines, and those from malt. 5. An excessive use of acids; this many young females have sadly experienced, and lost the bloom of health in pursuit of a fine shape. 6. Every cause capable of weakening or relaxing the tone of the stomach, in particular.

The cure is effected by medicines that are stimulant, strengthening, contrary to acid, impeding fermentation; a diligent use of proper exercise, and friction of the abdomen,

The diet should be chiefly solid, consisting of roasted, fried, broiled, salted, flesh meats; especially such as contain much essential oil, as wild fowl of all kinds. The drink rather generous, as Rum, Brandy, &c. properly diluted.

Directly

Directly contrary to this state, is that in which the bile has contracted an alkallescent acrimony; in which case it becomes very acrid, pungent, and irritating.

The symptoms which indicate such a condition of the bile, are constant thirst; sense of heat in the stomach and bowels; fœtid breath, a bitter or sulphurous taste in the mouth, and similar eructations; loss of appetite, nausea, and reachings to vomit; evacuations upwards and downwards of a dark coloured, or very yellow, thin, and frothy bile, acrid and fœtid, with sharp colicky pains; the white part of the eyes have a yellowish cast, and the urine is in small quantity, and high coloured. The body wastes away by slow degrees, the healthy suffusion of red in the skin vanishes, and the patient often dies from violent evacuations.

Its predisposing and occasional causes are, 1. A naturally robust and bilious temperament. 2. Abuse of animal food; especially high dishes, when the flesh is kept

kept till it verges to putrefaction. 3. Neglect of vegetable diet, farinaceous food, and acids. 4. A constant drinking of spirituous liquors, as I maintain, from their being capable of fermentation in their own nature, and universally impede that necessary process in our aliment. 5. Previous inflammations of the Liver.

The cure is performed by medicines obviating putridity. By mild demulcent food, especially boiled white meats. A milk and vegetable diet; here I mean to include the use of recent vegetables and fruits. The drink must be chiefly water, or mixed occasionally with fermented liquors; as wines, especially our made ones, cyder, perry, malt-liquors, &c. Rest of body, and, in case of violent spasms, the warm bath.

The Bile may also offend in its degree of consistence.

It may be excreted in too thin a state to answer its intention in the œconomy.

This

This arises from two causes; a naturally weak and inert condition of the fluid itself; or increased irritability of the gall bladder and ducts, not suffering the bile to be properly thickened by absorption, which requires delay. This frequently occurs in various fevers, causing great evacuations of bile upwards and downwards.

The cure of the first is hinted at, when speaking of the acescency of the bile; that of the second is effected by smooth demulcent diet, by sedative and antispasmodic medicines.

The Bile often, on the other hand, contracts too great a degree of consistence in its receptacles; I have often found it more so than the thickest syrups; it has been found nearly resembling pitch. This condition of the bile was the *Atrabilis* of the ancients, and, in compliance to them, so termed by the moderns; as they were ignorant of its nature, it is no wonder their conjectures upon it, and of the various

rious changes they imagined it capable of effecting in the system, were exceedingly vague and incoherent. The great *Boerhaave*, and his learned commentator, are, in every respect, unsatisfactory, when treating upon this, in the light they held it, imaginary humour.

This disordered state of the Bile proceeds from every cause capable of preventing its exit into the intestines; by its consequent delay in the gall-bladder, its fluid part becomes lost by absorption; and this arises either from gall-stones completely filling up the duct, or from a schirrous closely compressing its sides together. The first cause is curable, and will be treated upon fully; the second is incurable, and can seldom be found but by opening the body after death, of which I have seen many examples; and cannot with propriety be treated upon here; being a disease no ways allied to the bilious class.

The Jaundice is not in strictness a disease of the Bile, but a consequence of it only; so that I shall only treat of it in a general manner, as far as may be necessary for understanding what may follow hereafter.

When the Bile regurgitates, and is thrown back into the mass of blood, in consequence of its natural passage into the bowels being impeded or stopped, the disease is called a Jaundice.

The causes that may stop the excretion of the bile, and thus become occasional causes of a Jaundice, are manifold.

1. The Bile may become too viscid to pass thro' the ducts; but this is not very frequent, nor will it last long.

2. Concretions, or collections of hard faeces in the duodenum, may stop up the orifice of the duct, but this will be only transient.

3. Spasms

3. Spasms of the ducts themselves, as being muscular parts, and endowed with considerable sensibility. Thus we are told of sudden jaundices from violent fits of anger; and I have seen degrees of it in several spasmodic colics,

4. Mechanical compression of the ducts, by swelling inflammations, and schirrous affections of parts adjacent; I have lately seen an obstinate one from the last-named cause. These are mostly incurable, but not frequently met with. Here may be added an adhesion of the sides of the duct together; a very rare occurrence, but a case of it fell under the inspection of the late Professor *Monro*.

5. Biliary calculi, or stones in the gall-bladder, or common duct; this is the most common cause, and is the case in at least nine times out of ten. But it must be observed, that when the stones are in the gall-bladder, or cystic duct, the patient may have no degree of jaundice, as a quantity of bile can now pass through the

hepatic duct into the bowels; but when they are in the common duct, a jaundice must necessarily follow, as neither the cystic, or hepatic bile, can pass into the intestines.

From this view of the occasional causes of a Jaundice, we see that it is a disease, though rarely, yet sometimes, incurable in its own nature; hence the folly of pretending to universal remedies.

Having now premised what was thought necessary for understanding the chief subject of this Essay, I shall proceed without farther delay.

S E C T. V.

Upon the Nature and Composition of Biliary Calculi.

BILIARY Calculi or Gall-stones are not, as is generally imagined, meer inspissated bile, or a fortuitous concretion
or

or coagulation of its more gross and feculent parts; they are various, and regularly formed compound bodies,

They are composed of various concentric coats or layers, formed round a center or nucleus. The layers are frequently of various colours, green, red, black, or yellow; the nucleus is generally black. If one of them be divided in the middle and polished, the different coloured coats make a beautiful appearance. Sometimes they are found to shoot in the radiated form, the nucleus being the centre; but this is not common. When the stone is formed of several small ones adhering together, every one composing the aggregate hath its own proper centre; in this they resemble the other animal calculi.

Their surface is generally of a brown colour, sometimes black, resembling jet; at others, yet less frequent, they are white. *Heister* took one from the gall-bladder of a woman after death, of the size of a walnut, of a reddish yellow colour, resembling gamboge.

They

They are generally smooth, as if polished, which is more particularly the case when several are lodged together in the gall-bladder, as by their mutual friction they polish each other. When the surface is scabrous and rough, they are generally solitary; it has sometimes the appearance of sparkling granulations. I have seen several of them incruited over with crystals, of various beautiful figures, nearly resembling spar.

They differ much in solidity; some of them, especially soon after excretion, are so soft as to yield to an impression made by the fingers; you may generally crush them with a moderate force; many are so hard as to require a smart stroke of a hammer to break them. In texture some of them much resemble a piece of hard *Venice* soap; others in hardness resemble marble, mostly friable and brittle.

They vary much in their figure, being generally more or less angular; this is undoubtedly owing to their mutual pressure

sure upon each other, and almost infallibly shews them to be numerous. When they are of a perfectly round, or oval shape, without dint or impresson upon their surface, I have always found them to be solitary.

They have been found of all sizes, from that of a pea to a walnut; I have seen one nearly of the size of a hen's egg. Their number is no less uncertain in different subjects, being found from one to some hundreds in one single patient; they are generally small when numerous, and *vice versa*,

They are for the most part of small specific gravity, when compared with their bulk; most of them swim in water, yet others sink when immersed therein. They generally readily melt and inflame in the fire, or flame of a candle, leaving a small quantity of calx behind; others do not so easily inflame, but rather melt like wax.

S E C T.

S E C T O R V
Upon the Solubility of Biliary Calculi.

I Do not mean to enter upon a circum-
 stantial detail of the various experi-
 ments which I have made upon this sub-
 ject, in this place, being more calculated
 for a work of another kind, in which I
 expect they will make their appearance.
 Some general remarks upon the subject
 may be useful, without running out into a
 philosophical disquisition, which an Essay
 would not admit of.

Alcalies, whether fixed or volatile, mild
 or caustic, have scarce any action upon
 real biliary calculi, though they dissolve
 the urinary ones; some have imagined a
 contrary result; perhaps a grumous con-
 cretion of the bile may have been mistaken
 for a calculus.

Dulcified spirits act upon them con-
 siderably, and extract some chrystalizations
 from their substance.

Neutral

Neutral saline liquors have no effect in destroying their texture, yet they extract colour from them. Recent vegetable juices, even those of the *semiflosculosa*, so much esteemed by *Boerhaave* and his followers, in such cases, have no sensible effect.

The operation of different acids upon them is a striking instance of the necessity of experiments, and the fallacy of reasoning *a priori*. We should imagine that, as acids, they all possess similar properties, experience proves the contrary. The mineral acids, although diluted, have no action upon biliary calculi; but on the contrary seem to harden their texture. On the contrary, when they are immersed in vegetable acids, their bulk is enlarged, they grow softer, and in a short time the different layers separate from each other, and subside to the bottom, the liquor becoming clear by subsidence.

Essential oils do not appear to dissolve them, but they have a power of destroying

ing their texture, and reducing them into minute pieces.

Alcohol has a considerable effect, extracting a large quantity of chrysalizations; when combined with essential oils, this power is greatly increased.

These experiments, amongst many more, abound with practical inferences, and have been the foundation of an extensive, and, I hope I may say, successful practice, in almost all kinds of bilious complaints; future experience will enable me still farther to extend the application, and prove their utility.

S E C T. VII.

Symptoms of Stones in the Gall-bladder and Ducts.

WE shall endeavour, in this account, to commence as early as possible in the disease, and enumerate the symptoms

toms attending biliary concretions in their stage of formation, when they first begin to disturb the functions of the body.

In order to attain this end, I have divided the symptoms into three different stages, the first, second, and third stage, as they differ much from each other, and often require a different medical treatment.

In the first stage of the disease, I suppose the stones to be only forming. In the second, they are perfectly formed, but still in the bladder. In the last, they are forcing a passage thro' the biliary ducts, into the bladder.

The symptoms will differ, and be more or less distressing, according to the constitution of the patient; the greater or less irritability of his system; the number or size of the stones; their shape, roughness, gravity, their situation in the gall-bladder or ducts, &c.

Instances have occurred, in which they were to be felt externally; but when we consider the situation of the gall-bladder, and the thickness of the abdominal parietes, this must be very rare. *Lentilius* and *M. Petit*, each of them observed an instance of this; but it has not occurred to me, or any other that I know of,

The signs of the first attack are obscure, and generally attributed to some very different cause. The stomach and bowels are usually the first parts that suffer, when there is neither pain, or any other symptoms to lead to the supposition of the gall-stones.

The symptoms of the first stage are, loss of appetite, an unusual sensation of faintness at the stomach, especially when fasting; or, if they have not more frequent repasts than when in perfect health, rumbling of wind in the stomach and bowels, with sour eructations, something sulphureous, and heart-burn; sudden dislikes to particular kinds of food, formerly agreeable;
lowness

lowness of spirits, tremors, palpitations of the heart, and the whole train of symptoms generally called *Nervous*.

When we consider the great sensibility and irritability of the alimentary canal, and its aptability to be affected by changes in every other part of the system, we readily comprehend that it must suffer early in consequence of irritation in the biliary passages. The bile may also, in consequence of a morbid change, be incapable of performing its office in perfecting the digestion of our food; hence acidities, inflations, and spasms of the stomach and bowels.

In this stage of the disorder, how certainly might health be restored by proper treatment? Not by bitters alone, as is the common practice. I know from experiments, that they obviate the three kinds of alimentary fermentation, and from stopping the first they entirely destroy the digestion of our food; they ultimately also never fail to produce atonia in our solids.

Professor

Professor *Gaubius* related to me several instances of the bad effects of a long use of bitters; the Gout-powder furnished many: And I have seen many examples of such debility induced in the stomach by a use of bitters, that the poor patient was obliged, many times, with great and unfeigned reluctance, to procure temporary ease by spirituous liquors, at the certain destruction of life. I desire therefore to warn against their improper use, now become so general as to be every one's prescription for disorders of the stomach; they are certainly capable of effecting many important purposes; but a just idea of their properties and effects only can enable us to obviate their pernicious consequences.

Such is generally the situation of a patient in this stage of the disease, often looked upon as nervous, hysterical, &c. and the patient confirmed in this opinion, from the inefficacy of bitters and cordials, is at length attacked by more alarming symptoms, and driven to seek out other means of relief.

Symp-

Symptoms of the second stage. The patient now complains of a heavy, seldom acute, but fainting pain in the region of the liver, generally exactly under the pit of the stomach, but deep seated; and often a sensation, as if a cord was fixed from that part to the navel, and forcibly stretched. The pain often strikes up as from a centre, to the spine of the back exactly betwixt the scapulæ, sometimes down to the right kidney, and to all adjoining parts.

The pain has always its remissions, and pretty generally intermits. In which last case, the patient can frequently foretel the fit by an odd kind of rotatory sensation about the pit of the stomach, not easily described. It is always attended with a convulsive contraction of the bowels towards the affected part; with flatulencies, often to such a degree, that the patient refers the greatest part of his sufferings to that symptom alone; eructations, and intolerable faintness.

When

When the pain has compleat intermissions, it has a surprizing tendency to return at certain regular periods; frequently once every twenty-four hours. I have seen cases where the pain came on for a long time together about eight in the evening; in some at ten at night; others at a more early hour: Yet they frequently have smart returns at other times of the pain, tho' of short continuance, if compared with the chief fit.

The violence of the pain obliges the patient to an incessant change of postures in hopes of ease. The most relief is generally obtained from sitting in a stooping posture with the knees raised, and embracing them; in which position the belly becomes pendulous, by which the weight of the liver, and other adjacent viscera, is in part taken off from the gall-bladder.

The patient has now great anxiety about the præcordia, cardialgic anguish, great acidities in the stomach, nausea, sickness, and vomiting, especially in a morning,
after

after fasting the night; what is brought up is generally in small quantity, sour or frothy, sometimes mixed with a small portion of bile. The body is generally costive, with clay-coloured stools; sometimes, though rarely, there is a bilious looseness; yet they have frequently a loose stool or two when the fit is over, to which the patient attributes his relief; this is merely the consequence of the preceding irritation, and shews an abatement of the spasms.

The urine, during the fit, is mostly high coloured, in small quantity, and without sediment; but after it is gone off, it is of a saturated bilious colour, turbid, when cold, with a copious reddish or pink-coloured sediment.

The colour of the face is at times very little altered from health, and the patient often keeps his natural corpulency surprisingly, considering his sufferings; but if the white part of the eyes be carefully examined, a yellowness may generally be

perceived therein: But, in general, the countenance becomes pale, yellowish, fallow, and cachectic: the body gradually wastes, and a dropfical tendency takes place, hastening the fate of the patient.

The patient has usually more or less pain in the right shoulder or arm; a symptom common to most diseases of the liver. It is generally overlooked by the patient, or attributed to a rheumatic cause. Dr. *Baglivi*, in his *Treatise de Bilis Naturâ*, gives an account of a patient of his, who was afflicted with most violent pains in his right arm for upwards of a year before his death; the body being afterwards opened, no disease appeared, except two large stones in the gall-bladder. His countenance had been for several years of a pale Citron colour, especially the white part of the eyes, but the pain in his right arm yielded to no kind of remedies. Other instances of this are recorded by medical authors.

This stage of the disease sometimes continues for several months, or even years.

When

When the patient quits no stones, or obtains only a temporary relief, his strength fails, and being worn out with sickness, pain, and dejection of spirits, a dropfy generally closes the scene of life.

When the stone is single and very large, or composed of many small ones adhering together, there can be little hopes of its passing the duct; the patient must consequently, unless a method of dissolving it be found, pass the remainder of his life with more or less of the symptoms of this stage, of which there are daily instances. If, on the other hand, the stones be detached, or not large, and the ducts easily dilatable, they endeavour to force themselves a passage into the bowels, which is nature's effort to free the body of the disease, and composes the third stage,

Yet it is really surprizing to observe the power of nature in providing for the health of the body: I have seen several examples of a gall-stone passing, some near the size of a walnut, the patient all the time in

extremity of torture. A violent spasm of the duct, from the irritation of the stone, seems in many cases to be the chief obstacle to its passage; in which case, sedatives prove the most efficacious evacnants.

The following are the signs by which we know the presence of the third stage, that the stone is actually forcing its way out of the body. The patient is commonly seized with a sudden cold or chilly fit, seldom of long continuance, but returns frequently. He complains of a most violent and acute pain about the pit of the stomach, but deep-seated, which shoots up towards the shoulders, and downwards towards the small of the back, by which not only the viscera of the abdomen, but also of the thorax, are violently affected with strictures, and forcibly drawn towards the affected part. The pain is generally attended with extreme sickness, and incessant reachings to vomit, by which some frothy and bilious matter is rejected; some have neither of these symptoms, although the pain was so violent that they seemed
upon

upon the rack. The extremities are then cold, and a cold sweat bedews the forehead and breast; sometimes they faint by reason of their excessive torture, and remain for some time in an insensible state; at others they are convulsed, have a disposition to a delirium, and a jaundice comes on suddenly. They complain of being almost burst with wind, of great faintness, difficult respiration, inexpressible anguish, and restlessness. The body is generally constipated, the urine sparing and high-coloured,

Experience has now convinced me, that this state is much oftener attended with topical inflammation, and general fever, than is usually apprehended; or I had supposed when writing the first edition of this Essay; and wish to inculcate it as a matter of the greatest importance. In some cases I have known very little disposition to fever, and as little alteration in the pulse; but such, in comparison to the former in number, are much less frequent.

These

These symptoms usually continue with remissions until the stone is got out of the duct into the intestines, and often end with gripings and a bilious purging. The skin then becomes soft and moist, the extremities warm, the pulse soft and full, and there is a copious sediment in the urine; to which succeeds a warm universal sweat, and a remission of all the symptoms.

We here suppose that nature has completed her own work; but if the pain continues long, constant, and intense, the nervous system is dreadfully affected with convulsive motions, distentions of the limbs and joints, epileptic spasms; and if to these are joined such as denote considerable vascular irritation, as very quick and hard pulse, dry tongue, great heat and thirst, &c. we have reason to suspect a large rough stone firmly impacted in the biliary duct, with inflammation of the part, which, unless very skilfully treated, will soon hurry the patient out of the world.

The

The patient is often sensible of the dropping of the stone into the bowels; sometimes they have a sensation as if something had broke within them, and as if warm water was flowing from the part, from the consequent free passage of the bile.

The stone being, during the fit, discharged out of the ducts into the intestines, is evacuated quite out of the body by stool.

Sometimes, although a rare occurrence, they have been brought up by vomiting. The learned Dr. *Huxham*, in a letter to Dr. *Coe*, gives two instances of this, in the cases of two Gentlewomen who, after several days incessant torment of cholic, vomiting, jaundice, &c. threw up several gall-stones from the stomach, and afterwards recovered. Such cases are much to be dreaded, as proceeding from the extreme violence of the spasms, reversing the natural peristaltic motion of the bowels.

The

The following passage from *Hippocrates* seems to shew that this disease was not unknown in the most remote ages, at least in *Greece*, but the unfrequency of dissections kept them in ignorance as to the cause.

Qui lumborum et lateris dolore absque ullâ occasione tentantur, ii in morbum regium incidunt. *Coac. Prænot. Sect. 2.*

It frequently fell under the inspection of the accurate *Dr. Sydenham*; but not suspecting the real disease, he supposed it an hysteric cholic, and thus describes it:

Nonnunquam, says he, in colon, et regionem scrobiculo cordis subtersam impetum faciens, dolorem vix ferendum infligit, ihiacæ passioni haud absimilem; ubi ægra immodicè vomit, colluviem quandam viridem, nunc etiam insoliti alicujus coloris, rejiciens. Sæpe etiam postquam ægra ad multos dies jam dicto dolore (qui vel stoicorum anadænar expugnaret) et continuo vomiturationis conatu tantum non fuerit enectâ, tandem ictero intensiore omnem corporis

*corporis superficiem ad instar eraci tingente,
solvitur paroxysmus.*

Here the violent pains, their situation, vomitings, and subsequent jaundice, clearly shew the real disease to have been gallstones.

Having now given a pretty exact account of the symptoms attending the presence of stones in the biliary passages, I shall next proceed to the predisposing and occasional causes of the disease.

S E C T. VIII.

Predisposing Causes.

IN order to ascertain this, we must be acquainted with the composition of the calculous concretions; and it is by experiments alone that this knowledge can be acquired.

H

Biliary

Biliary calculi have been generally looked upon as mere concretes of coagulated or inspissated bile; but they are in reality regularly formed compound bodies, consisting of a large proportion of a saline matter, capable of chrysalization, a quantity of bile, and sometimes a small portion of earthy matter.

Saline bodies, in general, have a very strong attraction to other bodies, readily combining with them, and forming various kinds of compounds; hence in whatever part of the body these saline particles are generated, being assisted by the concurrence of occasional causes, concretions will be formed.

It is probable that a constitutional aptitude to generate too much of this saline matter, may predispose to this disease.

Thus, the combination of this saline matter with the bile forms gall-stones; with the earthy part of urine, calculi in the urinary passages. Analogous to these
may

may be the concretions formed in other parts of the body, in the salivary ducts, and the chalk-stones in the gout; and we generally find that there are few patients having gall-stones who have not at the same time a tendency to urinary calculi; and from experience I find the same may be said of the gout. *Hoffman* gives an instance of stones found both in the biliary and urinary passages of an old man who had been long subject to the gout.

S E C T. IX.

Occasional Causes.

THESE seem to be chiefly three, a too sedentary way of life; excessive passions of the mind; errors in diet.

The benefit of exercise is to increase the tension and spring of the animal solids, by which their action upon their contained fluids is invigorated. Hence the circulation of the blood, all the various

secretions and excretions are carried on in a free and uninterrupted manner; strength of body, a free and uniform flow of spirits, good appetite and easy digestion are the happy consequences. What the *Mantuan* Poet formerly said of Fame, is applicable to the human body,

Mobilitate viget, viresque acquirit eundo.

Directly opposite are the baneful effects of an idle and too sedentary life.

Neglect of muscular motion, by inducing a weak and diminished tension of the solids, lays a most certain foundation for a number of diseases; the muscular fibres are by it rendered torpid and unfit for motion, incapable of propelling with due energy their contained fluids, by which stagnations, concretions, and various kinds of acrimony are formed, the body becomes loaded with fat, or swelled with a dropsy.

It was the mandate of the Almighty to man, that he should labour for his bread; the present and future advantages of such a decree bespeaks omniscience.

It

It hath been already intimated, that a stagnation of the fluids, in the affected part, is absolutely required to favour the combination of all calculous concretions. Agreeable to this, we find that diseases of this kind are seldom found but amongst men who lead an inactive life, such as devote their time to learning, excessive study; those whose incomes place them above the necessity of labour.

The compression of the viscera of the abdomen, by sitting at their studies in a stooping posture, with the stomach pressed against a hard body, as a table, desk, &c. by disturbing the functions of the adjacent viscera, especially the liver, greatly contributes to bring on diseases of this kind. I know several who have prevented relapses by a mere cessation of this pernicious custom.

Great exertion of the mental faculties, as requiring inaction of body, inducing inertia in the nervous system, and weakness of the solids, always favour such disorders.

orders. They have been called the diseases of the learned, and many of the greatest ornaments of humanity have fallen victims to their rage. I seldom have seen a fool tortured either by bilious diseases, stone, or gout.

Violent, or long-continued passions of the mind, produce dreadful effects in the body. The depressing ones, as Fear, particularly affects the stomach and bowels, interrupt their natural functions in the œconomy; hence arise all the symptoms of indigestion, acidities, spasms, obstructed viscera, jaundice, and dropsy. I have known many bilious diseases arise from this cause, curable only by exciting some contrary passion, a difficult remedy in its application, in effect powerful. A physician, who thoroughly understands the human heart, will be often capable of obviating the bad effects of the various passions upon the body, by applying their contraries. When the system is depressed by grief, fear, despondency, &c. and diseases induced in consequence, medicines will

will have little avail, unless you can amuse the mind of the patient, recall his ideas into some different tract, and inspire him with hope and confidence, which, except in some cases and extraordinary gloom, may often be effected: But, indeed, as we can much sooner weaken than strengthen the body, so it is with the mind; we find it easy to depress, but difficult to incite.

The effects of the inciting passions, as joy, anger, &c. when violent, are more immediately dangerous, producing instant death, madness, convulsions. A fit of anger, when less violent, has given rise to a sudden jaundice, by producing strictures in the stomach and duodenum.

Regarding errors in diet, it is unnecessary to repeat what has been said in a former part of this essay, where we have pretty fully discussed the matter, in treating of the diseases of the Bile.

S E C T.

S E C T. X.

Method of Cure.

STONES in the gall-bladder are a disease which hath hitherto been esteemed incurable.

The excellent *Baglivi* is very positive in his prognosis. *Quare*, says he, *cum icteros videris pertinaces, vel sanatos sed recidivantes, pro certo habeas, eos a calculo vesicæ felleæ progigni, ac proinde incurabiles prædicito, quod cadaverum sectiones te docebunt.* Tract. de Bilis Naturâ.

Riverius, who was Physician to the French King, says, *Calculus, cum dissolvi non possit, morbum facit incurabilem.*

Cap. de Ictero.

Sylvius de la Boe expresses himself in this manner, *Cum difficile sit calculos ex bile ortos dignoscere, non mirum si eorundem curatio res inaudita videatur multis medicis.*

Prax. Med. lib. i.

Dr.

Dr. Coe, who wrote professedly upon the subject, and other physicians, place all their hopes of a cure, in endeavouring to force their passage into the bowels; a very uncertain matter, and seldom practicable.

It is therefore really surprizing, that practitioners have not applied themselves to the finding of methods by which they could be dissolved. Solvents have been diligently sought after, nobly encouraged, and generally applied in cases of urinary calculi; yet those of the biliary passages, though of infinitely more dangerous tendency, have been neglected.

From a series of experiments, made upon the calculi out of the body, I discovered a method of dissolving them with ease and rapidity; and, from repeated experience, doubt not but they may be thus destroyed in the living body. The experiments which I have premised will sufficiently evince their solubility, which is happily practicable by solvents of such

I

different

different powers, as to be adapted to the peculiar states of different patients.

When I published the first edition of this essay, only a few cases had occurred for applying my experiments to practice, and that with the happiest effect; but since that time, owing to that single successful attempt, my practice in bilious diseases hath been very extensive, and the utility of my experiments sufficiently proved.

It is pretty generally known, that I make great use of a saturated solution of essential oils in alcohol in biliary diseases; several have adopted this practice, some, I doubt not, with every necessary precaution; but as I have seen it misapplied in a most absurd and dangerous manner, a caution becomes necessary regarding their use.

This class of medicines are powerfully stimulant; their use is therefore absolutely forbid in all cases attended with increased motion

motion of the vascular system. How little this rule, most important to the welfare of the patient, has been attended to, the following instance (among several which I have had opportunity to see) will evince.

I was called to a Gentleman who had been lingering near a year with a jaundice, and other symptoms of a diseased liver; he informed me that he had been taking the essential oils for biliary calculi for some time, and yet continued it, but without benefit. I found him labouring under a confirmed Hectic Fever, the consequence of a suppuration in the liver, with intense thirst, parched skin, and his pulse at the rate of one hundred and twenty-five strokes in a minute; and in this condition was he swallowing large doses of essential oils. Such misapplications of medicines, and inattention to the real situation of an innocent deluded patient, I cannot but raise indignation in a mind of the least sensibility.

For the welfare of the sick, or the honour of his profession.

When

I have several times known them given, under a suspicion of gall-stones, in cases of real inflammations of the liver. Such mistakes, when they proceed from ignorance, are severely reprehensible; but when from inattention, altogether inexcusable.

We can always know from the pulse when the vascular system is in a state of increased action, which, as hath been remarked, often attends biliary calculi. In all such cases the vascular irritation must be the first object of attention, as pregnant with certain future mischief, inflammation of the liver, suppuration, schirrus, incurable hectic, and dropsy.

Few are possessed of the *Tactus Eruditus*, so far as to distinguish this in very nice cases, which requires great experience. Dr. *Heberden*, in his account of the Hectic Fever and the pulse, (*Med. Transf.* vol. II.) hath performed an important service in this view; and I would refer every practitioner to them, if he hath the least regard for the welfare of the sick, or the honour of his profession.

When

When biliary calculi are attended with vascular irritation, the antiphlogistic method must be followed, previous to every thing else, till every feverish symptom is subsided, and the pulse brought down to its natural number; until then such stimulants are inadmissible,

In all cases of irritability, when unconnected with fever, essential oils are powerfully antispasmodic; upon this principle they are useful in various diseases of the alimentary canal,

In treating of the diseases of the bile, mention is made of the effects of vegetable acids; besides their effect upon the biliary calculi, and the aliment in the stomach, they have a sedative power upon the solids, and diminish their power of action; by these properties they become powerful medicines in some kind of bilious disorders, where essential oils are improper, as in cases attended with general fever, or when the bile has contracted an alcalescent disposition, &c.

General

General practice makes little distinction
 betwixt the different acids, from which
 many errors have originated, and still
 subsist. The mineral and vegetable acids
 differ intirely in many instances, regarding
 their effects both upon our solids and
 fluids; one instance I have given above,
 which no theory could have suspected;
 experiments have shewn me many more.
 The mineral acids check all the three
 stages of alimentary fermentation, the ve-
 getable accelerate the two first, from
 which may be deduced several very im-
 portant remarks, regarding the nature and
 cure of Stomach-diseases in general, too
 copious to be inserted in this essay.
 The treatment of this disease is, in many
 respects, different in the three different
 stages; we shall therefore proceed to give
 some general remarks upon what may be
 necessary to be done in each.
 The first stage of the disease admits of
 an easy cure, which is effected by aroma-
 tics, bitters, antiacids, and suitable diet.
 Their

Their effects are easily understood from what we have inculcated in a former part of this essay.

As there is reason to hope that the concretions have not yet acquired any considerable size, or solidity, their exit may be promoted by emetics and purgatives; these, especially the former, by the shock they give to the system in general, particularly to the biliary passages from their vicinity, are of great use in dislodging and forwarding the exit of gall-stones; nor must the use of proper exercise, especially upon horseback, and friction of the abdomen, be neglected.

When the disease hath arrived at the second stage, it becomes more obvious, and can scarcely be misunderstood by practitioners of knowledge and experience.

Emetics are here exceedingly useful, both in promoting the excretion of gall-stones, and evacuating the viscid phlegm, and other impurities, from the stomach,
and

and relieving the patient of many complaints originating from that cause, as nausea, sickness, head-ach, giddiness, &c. The costive habit of the patient calls for the repeated use of medicines that stimulate the bowels and open the body gently, by which many uneasy sensations arising from indigestion, accumulation of morbid matter, spasm, and flatulency are obviated.

In cases accompanied with an acid, *Saburra*, *Rhubarb*, or *Magnesia*, especially when calcined, are eligible purgatives. In the bilious, or *alcalescent*, the various neutral salts; the *ChrySTALLI Tartari* are of excellent use as a present laxative, and acting more remotely as an acid of the vegetable class. The *Oleum Ricini*, or Castor-oil, is, in many cases, an useful laxative, yet it seldom agrees with people whose digestive organs are much weakened, but produces nausea, flatulence, and rancid belchings.

We are now to attempt their solution, regarding which no universal rule can be laid

laid down, the peculiar state of each patient must settle the mode of procedure.

During the third stage, or when the concretions are actually forcing their way through the ducts, the method of treatment is, in many respects, very different from that proper in the two former conditions of the patient. Here is no opportunity of giving evacuants or dissolvents; the intention must now be directed to diminish the general spasms, and relax the ducts.

The first and principal endeavour must be to gain a truce by anodynes. They are now absolutely necessary to check the enormous vomitings, to enable the patient to retain other medicines, to abate the excessive torture, and in many cases even to support life itself.

Regarding the dose, it is not the quantity but the effect that must be our rule; it is however safe to exhibit them in frequent

quent small doses, until some remission is obtained. I have known various instances in which some hundred drops were required, before a respite from the pain could be procured. When we find the patient bears opium well, a suitable dose given at once is preferable. In this disease, as well as in most spasmodic ones, it is surprising how well the patients bear opiates; it is a singular providence that the more real necessity there is for their use, the less they affect the body when their anodyne effect is over.

I must here again inculcate the necessity of the most strict regard being paid to the state of the vascular system, otherwise you may ruin the patient, whilst vainly expecting a cure. The many mistakes which have fallen under my observation, from a neglect of this, makes me anxious to enforce this rule as much as possible.

In such cases, where the Bile is in an alcalescent state, and the temperament hot and bilious, the vegetable acids are indicated.

eated. In phlegmatic habits, where the vessels are weak, the circulation languid, the bile inert, and the powers of digestion weak, the essential oils prove very beneficial, and are the solvents to be made use of.

Violent vomitings are frequently stopped by the effervescent saline draughts. A mixture of Tinct. Stom. and common Mint-water, in equal proportions, has answered when the other hath failed. An epithem of Mint-leaves boiled in Claret, or Port wine, and applied to the pit of the stomach, answers very good purposes in this respect. This symptom is sometimes so violent and distressing, as to require particular attention.

Proper clysters are in this stage of important use, not only as they tend to procure stools, but as also a kind of internal fomentation applied near the seat of the disease, helping in diminishing the spasms, and relaxing the ducts.

Nor are we to omit topical applications, as hot flannels, bladders filled with hot water, or fomentations, to the pit of the stomach, and the region of the liver. A warm bath hath often excellent effects in violent cases, where practicable; a large earthen jar filled with hot water, and wrapped up in flannel, has given relief, being placed at the foot of the bed, so that the patient may lay with his feet against it, and it will retain its heat for several hours.

By this procedure the fit is rendered more tolerable, of shorter duration, and often a compleat remission of the pain is obtained. This opportunity must be seized to attempt a perfect cure, by dissolving the concretions.

After the disease is totally removed, the convalescents must be very careful to guard against a relapse. This is effected by proper tonic and stomachic remedies, certain mineral waters, sea-bathing, an accurate diet, and exercise of body. Where the

circum-

circumstances of the patient will admit of it, a journey, and a course of the *Bath* waters, will now certainly reinstate him, though it may have been tried in vain, previous to the solution of the gall-stones.

As preventatives, I would, above all, inforce exercise, and moderation in every article of food; having no doubt, but that inactivity and intemperance are not only the occasional causes of biliary concretions in particular, but of all chronical diseases in general.

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And Member of the MEDICAL SOCIETY at EDINBURGH.

————— *seraque ope vincere fata*
Nititur; et medicas exercet inaniter artes.

OVID. MET. lib. ii.

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